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APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR CERTIFICATE OF CONVENIENCE AND NECESSITY AUTHORIZATION AND RELATED RELIEF FOR THE ACQUISITION OF WIND GENERATION FACILITIES	**§**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' SIXTH REQUEST FOR INFORMATION

OCTOBER 22, 2019

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' SIXTH REQUEST FOR INFORMATION

Question No. TIEC 6-1:

Please explain why the Aurora model was used for forecasting the Southwest Power Pool locational marginal prices used in the economic analysis of the North Central Energy Facilities rather than the PROMOD methodology that was used in the economic analysis of Wind Catcher.

Response No. TIEC 6-1:

In Wind Catcher, the company's analysis focused on evaluating: (1) the value of buying 1,900 MW of wind capacity (as opposed to a baseline market-purchase case); and (2) the value of buying the 1,900 MW of the Windcatcher project accessing high-quality wind resources in the Oklahoma panhandle and delivering the energy to Tulsa North without the risk of curtailments or congestion (compared to buying the same amount of generation from generic wind resources in the SPP footprint).

These assessments required different nodal market simulations of the Base Case (i.e., the baseline market purchase case), the Generic Wind Case and Wind Catcher Project Case. This is because each of these cases would result in very different congestion and loss-related cost exposure for SWEPCO's customers, and those costs had to be analyzed to understand the relative value of purchasing 1,900 MW of generic wind capacity from across SPP versus purchasing 1,900 MW via the proposed Wind Catcher project. Further, since the two alternatives analyzed for purchasing this 1,900 MW of wind capacity (i.e., via the Generic Wind case and the Wind Catcher case) were so different in their impact on transmission system congestion and losses, and on the company's existing wind resources, it was necessary to also capture the differences in the market prices between these cases in the company's benefits analyses. Therefore, PROMOD was utilized to separately model each of these three cases and to estimate the case-specific near-term (2020 and 2025) market prices, and wind-related congestion and loss costs. PROMOD-based 2025 prices were then extrapolated based on the company's Aurora-based fundamental forecast for estimating the long-term market prices for the rest of the 25-yr study period. These prices were then used in the company's PLEXOS-based benefits analyses.

In this case, the focus is on the benefit of procuring the Selected Wind Facilities, and not also on other alternative means of wind procurement, such as with the Generic Wind Case in the Wind Catcher docket, and their impacts on market prices. Further, in the current analysis it is assumed that, whether or not the company purchases the Selected Wind Facilities, these facilities (or facilities that amount to similar total wind capacity, located in similar locations) will get developed in any case. This means that the wholesale market prices used in the company's PLEXOS benefits analyses will not be measurably different between a baseline reference case

and the Selected Wind Facilities project case. This also means that the congestion and loss costs associated with the delivery of energy from the Selected Wind Facilities—which can only be evaluated in PROMOD—can be evaluated for just one PROMOD case that includes the Selected Wind Facilities. These congestion and loss results can then be combined with the company's Aurora-based fundamental forecast for long-term market prices across various sensitivities. Since the company has always relied on its Aurora-based projection of long-term wholesale power prices in its PLEXOS modeling for Integrated Resource Planning needs and customer impact purposes, adding only the congestion and loss costs to the Aurora-based long-term price forecasts is suitable for the evaluation of the costs and benefits of the Selected Wind Facilities.

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Sponsored by: Johannes P. Pfeifenberger Title: Principal, The Brattle Group

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' SIXTH REQUEST FOR INFORMATION

Question No. TIEC 6-2:

Please state whether generation resource additions are an input or an output of the Aurora model.

a. If generation resource additions are an input, please provide the generation resource additions in the Southwest Power Pool that were assumed in developing each case of the Fundamentals Forecast presented in this proceeding (Base, High Band, Low Band, Base No Carbon, Low Band No Carbon).

b. If generation resource additions are an output, please provide a detailed explanation of how Aurora forecasts generation resource additions, including an explanation of what inputs affect forecasted generation resource additions, and what assumptions were used for those inputs for each case of the Fundamentals Forecast presented in this proceeding. In responding, please also provide the generation resource additions in the Southwest Power Pool that were forecasted by Aurora for each case of the Fundamentals Forecast presented in this proceeding.

Response No. TIEC 6-2:

Generation resource additions are an output of the Aurora energy market simulation model.

a. N/A

b. New generation resource types are input into Aurora along with unit operating characteristics, constraints and costs. The Aurora model calculates the real levelized net present value in $/MW for each potential new unit, including capital costs, and uses this cost to make decisions about forecast new unit additions and resource retirements. The Aurora model determines generation resource value from the difference between market price and generation resource cost for every hour for every generation resource in the region, which takes into account the system value during all time periods (i.e., on-peak, off-peak and during daily, seasonal, and annual periods).

   The Aurora model uses the following steps in the long-term optimization/capacity expansion process:

   - Aurora enumerates all potential new resources.
   - The value for each existing resource is determined.
   - The value for each new enumerated resource is determined.
   - Resources are sorted by value.
   - Resources with the most negative values are selected to retire.
   - New resources with the most positive values are selected to add.

- Aurora is re-run to compute new electric prices and resource values.
- The process is repeated until the system stabilizes.

This process is done by the model on a gradual basis using small sets of changes. Resources that create value on a going-forward basis will be considered constructed by Aurora, while those that have no value on a going-forward basis will be considered retired by Aurora.

Please see SWEPCO's supplemental response to TIEC 1-16 at Supplemental Confidential Attachment 4, Table 9, for the referenced inputs.

Attached please find TIEC_6_02_Attachment_1 for SPP resource additions forecasted by the Aurora model.

Prepared By: Connie S. Trecazzi — Title: Economic Forecast Anlyst Staff

Sponsored By: Karl R. Bletzacker — Title: Dir Fundamental Analysis

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PUC Docket No. 49737
TIEC's 6th, Q. # TIEC 6-2
Attachment 1

Annual SPP Modeled Capacity Additions (MW)

	Base		High		Low		No_CO2		No_CO2_Low	
Year	Gas	Renewables	Gas	Renewables	Gas	Renewables	Gas	Renewables	Gas	Renewables
2019		800		800		800		800		800
2020		800		800		800		800		800
2021		400		400		400		400		400
2022		400		400		400		400		200
2023		400		400		400		400		200
2024		400		400		400		400		200
2025		400		400		200		300		200
2026		400		400		200		200		200
2027		400		400		200		200		100
2028		400		400		200		200		
2029		300		300		150		200		
2030		300		300		150		200		
2031		200		200		150		200		
2032		200		200		100		50		
2033		200	1,231	300						
2034		200		200			1,231	100		
2035		100		150						
2036	1,231	100	1,231	250						
2037			1,231	200						
2038										
2039										
2040			1,231	100			1,231	100		
2041										
2042			1,231	100						
2043			1,231	100					1,231	100
2044			1,231	100			1,231	100		
2045	1,231	100	1,231	100			1,231	100		
2046	2,462	200	4,924	300			1,231	100		
2047			2,462	200						
2048	1,231	100	2,462	200			1,231	100		
2049			3,693	200						

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SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO TEXAS INDUSTRIAL ENERGY CONSUMERS' SIXTH REQUEST FOR INFORMATION

Question No. TIEC 6-3:

For each case of the Fundamentals Forecast presented in this proceeding, please state the nameplate capacity of wind and solar generation in the Southwest Power Pool that is either assumed or forecasted in Aurora for each year of the study period.

Response No. TIEC 6-3:

Attached please find TIEC_6_03_Attachment_1.

Prepared By: Connie S. Trecazzi — Title: Economic Forecast Anlyst Staff

Sponsored By: Karl R. Bletzacker — Title: Dir Fundamental Analysis

Cumulative Renewable Capacity[1] (MW)

	Base			High			Low			No CO2			No CO2 Low		
	Assumed (existing)	Forecasted (cumulative)	Total	Assumed (existing)	Forecasted (cumulative)	Total	Assumed (existing)	Forecasted (cumulative)	Total	Assumed (existing)	Forecasted (cumulative)	Total	Assumed (existing)	Forecasted (cumulative)	Total
2019	23,468	800	24,268	23,468	800	24,268	23,468	800	24,268	23,468	800	24,268	23,468	800	24,268
2020	24,796	1,600	26,396	24,796	1,600	26,396	24,796	1,600	26,396	24,796	1,600	26,396	24,796	1,600	26,396
2021	24,983	2,000	26,983	24,983	2,000	26,983	24,983	2,000	26,983	24,983	2,000	26,983	24,983	2,000	26,983
2022	24,983	2,400	27,383	24,983	2,400	27,383	24,983	2,400	27,383	24,983	2,400	27,383	24,983	2,200	27,183
2023	24,983	2,800	27,783	24,983	2,800	27,783	24,983	2,800	27,783	24,983	2,800	27,783	24,983	2,400	27,383
2024	24,983	3,200	28,183	24,983	3,200	28,183	24,983	3,200	28,183	24,983	3,200	28,183	24,983	2,600	27,583
2025	24,983	3,600	28,583	24,983	3,600	28,583	24,983	3,400	28,383	24,983	3,500	28,483	24,983	2,800	27,783
2026	24,983	4,000	28,983	24,983	4,000	28,983	24,983	3,600	28,583	24,983	3,700	28,683	24,983	3,000	27,983
2027	24,983	4,400	29,383	24,983	4,400	29,383	24,983	3,800	28,783	24,983	3,900	28,883	24,983	3,100	28,083
2028	24,983	4,800	29,783	24,983	4,800	29,783	24,983	4,000	28,983	24,983	4,100	29,083	24,983	3,100	28,083
2029	24,983	5,100	30,083	24,983	5,100	30,083	24,983	4,150	29,133	24,983	4,300	29,283	24,983	3,100	28,083
2030	24,983	5,400	30,383	24,983	5,400	30,383	24,983	4,300	29,283	24,983	4,500	29,483	24,983	3,100	28,083
2031	24,983	5,600	30,583	24,983	5,600	30,583	24,983	4,450	29,433	24,983	4,700	29,683	24,983	3,100	28,083
2032	24,983	5,800	30,783	24,983	5,800	30,783	24,983	4,550	29,533	24,983	4,750	29,733	24,983	3,100	28,083
2033	24,983	6,000	30,983	24,983	6,100	31,083	24,983	4,550	29,533	24,983	4,750	29,733	24,983	3,100	28,083
2034	24,983	6,200	31,183	24,983	6,300	31,283	24,983	4,550	29,533	24,983	4,850	29,833	24,983	3,100	28,083
2035	24,983	6,300	31,283	24,983	6,450	31,433	24,983	4,550	29,533	24,983	4,850	29,833	24,983	3,100	28,083
2036	24,973	6,400	31,373	24,973	6,700	31,673	24,973	4,550	29,523	24,973	4,850	29,823	24,973	3,100	28,073
2037	24,933	6,400	31,333	24,933	6,900	31,833	24,933	4,550	29,483	24,933	4,850	29,783	24,933	3,100	28,033
2038	24,927	6,400	31,327	24,927	6,900	31,827	24,927	4,550	29,477	24,927	4,850	29,777	24,927	3,100	28,027
2039	24,923	6,400	31,323	24,923	6,900	31,823	24,923	4,550	29,473	24,923	4,850	29,773	24,923	3,100	28,023
2040	24,920	6,400	31,320	24,920	7,000	31,920	24,920	4,550	29,470	24,920	4,950	29,870	24,920	3,100	28,020
2041	24,874	6,400	31,274	24,874	7,000	31,874	24,874	4,550	29,424	24,874	4,950	29,824	24,874	3,100	27,974
2042	24,667	6,400	31,067	24,667	7,100	31,767	24,667	4,550	29,217	24,667	4,950	29,617	24,667	3,100	27,767
2043	24,634	6,400	31,034	24,634	7,200	31,834	24,634	4,550	29,184	24,634	4,950	29,584	24,634	3,200	27,834
2044	24,627	5,600	30,227	24,627	6,500	31,127	24,627	3,750	28,377	24,627	4,250	28,877	24,627	2,400	27,027
2045	24,627	4,900	29,527	24,627	5,800	30,427	24,627	2,950	27,577	24,627	3,550	28,177	24,627	1,600	26,227
2046	24,627	4,700	29,327	24,627	5,700	30,327	24,627	2,550	27,177	24,627	3,250	27,877	24,627	1,200	25,827
2047	24,627	4,300	28,927	24,627	5,500	30,127	24,627	2,150	26,777	24,627	2,850	27,477	24,627	1,000	25,627
2048	24,627	4,000	28,627	24,627	5,300	29,927	24,627	1,750	26,377	24,627	2,550	27,177	24,627	800	25,427
2049	24,627	3,600	28,227	24,627	5,100	29,727	24,627	1,350	25,977	24,627	2,150	26,777	24,627	600	25,227

1 Net of retirements - assumes 25 year life for solar, assumes wind is repowered and retained in place